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AUTHOR Kraft, Richard H. P.
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ABSTRACT

Investment in education is as important to economic development as investment in physical capital. A cost-benefit analysis of education in Korea indicated that the rate of return for middle school education (20.0 percent) is significantly higher than that for high school (11.2 percent) and for college and university graduates (9.5 percent). There are important implications in this and other economic and manpower considerations for governmental and educational decisionmakers in Korea. Based on economic criteria, it is concluded that the expansion of middle schools should be given high priority. Social and humane arguments support this contention. (Author)

Implementing Cost-Benefit Research in Education

Prepared by
Richard H.P. Kraft
Associate Professor
Dept. of Educational Administration
College of Education
Florida State University
Tallahassee, Florida 32306

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I. Education as an Investment

The manpower requirements approach appears to have lost some of its momentum. The failure or refusal to respond effectively to educational and economic purposes, and the reluctance to question established practice has contributed to a diminishing credibility in the manpower requirements approach. This mindlessness is not the monopoly of individual "flying manpower specialists"; it is diffused remarkably evenly throughout many developing countries, whose educational leaders find it hard to believe that manpower criteria may not always be appropriate guides to educational planning. But countless specialists in the educational planning field have argued for a long time that manpower requirements models which ignore the costs of educational programs relative to expected benefits are inappropriate (Cash, 1969).

The main limitations of the manpower requirements approach are inherent in the implicit assumption that the demand for labor in a country is inelastic. That is to suggest that the amount of different kinds of labor required in the future will not adjust itself to changes of the wage level. Furthermore, as critics point out, in manpower education planning the implementation costs of educational plans are ignored since the method typically used is to attempt to

> ". . . meet the production and consumption targets specified in the economic development plan, although no comparison is actually made between the benefits and the costs of the educational policy. The problem is that, without such comparisons, any educational policy can be seen to be consistent with development objectives, irrespective of its real cost to society." (Chirikos and Wheeler, 1968)

Since this approach ignores costs, manpower planning is only a partial method of analysis. It may be true that employers will need workers with specific skills, but are they willing or able to pay for them? Manpower planners have often been guilty of identifying shortages and proceeding to train the appropriate number of workers regardless of cost. However, decisions to train additional workers or to expand educational facilities under conditions of scarcity require the balancing of costs and benefits (Kraft, 1969).

There is also the long-range problem of technological change which alters the need for various types of trained people. As seen in the past decade, the need for certain occupations has been eliminated entirely. To some extent the more technically progressive firms and industries may be used to guide future projections, but even these will not provide a complete picture. If men are trained to be flexible among jobs, the problems incurred by technological change may be lessened in part, and men will be able to alter their occupations with a minimum of retraining.

Many economists who have taken an increasing interest in education over the last ten years, are in complete agreement with Beeby, who states that the entrance of economic theory into the realm of education has been profitable because:

> The economic approach is an excellent means of encouraging education to move closer to reality, as so many educators have for long been demanding; the scientific methods of economics bring them a degree of precision which has a happy effect of educational discipling; economics, by demonstrating scientifically that education can be investment as well as consumption, offer a conclusive argument to induce society to accept an extra financial effort in favor of education (Beeby, 1966).

It is in this area that the manpower approach fails. It is a well-publicized fact that in the past years in Korea the economic plans always came "first". Educational plans were prepared only after the general economic targets were set. But education and the development of human capital cannot be isolated from society, culture or economics. And educational plans which consist mainly of manpower projections are bound to fail as they overlook the fact that education has repercussions on all activities related to the development of a growing society.

Rather than being confronted with a general manpower shortage, Korea has the more pressing problem of predicting what the future growth of technology will be and what general implication this growth has for its human resources development efforts. There can be no doubt that technology will change, just as world markets and the mix of Korean industry will change. In Korea, where considerable resources are being devoted to technological improvement, technology is expected to advance rapidly with corresponding increases in human productivity and modified human resource requirements. In view of this future for new technology and the concomitant predictable growth of knowledge and the further implication of these changes for transfer of knowledge through the educational processes, even the most sophisticated statistical projections of manpower demand and supply seem to be rather meaningless. For example, who would have predicted in 1945, that by 1968 the United States would employ a quarter of a million employees in the television industry!

The foregoing remarks should not be interpreted as advocating that no projections should be made. Obviously, educational plans must be based on some quantifiable ideas of what the future is going to be like. What we are cautioning against is the establishment of a more or less artificial "link" between educational output and future so-called manpower needs. While educational planners, mostly in developing countries, still rely heavily on quantitative manpower forecasts, it is well documented that the movement over the past few decades has been away from the quantitative manpower concept of directed or forced human resources and toward a social demand approach which attempts to organize human capital through economic market forces.

It is interesting to note that long-range manpower projections for Korea have been made although no systematic current information r arding labor supply and demand by various industries and occupational groups are available. Further, no manpower requirement and supply data on an area basis were available. Consequently long-range planning of manpower utilization become somewhat suspect.

II. Beyond the Manpower Concept

Seventeen years ago, at a Conference on the Utilization of Scientific and Professional Manpower, at Columbia University, Kenneth E. Boulding shocked his sophisticated audience with the statement that he found the whole manpower concept ". . . incompatible with the ideals of liberal democracy" (Boulding, 1968). In defense of this extreme position he argued that the "manpower abstraction" is appallingly crude, and that any attempt to think of the problem of allocation of human resources as if it were simply a matter of counting noses, misses most of the realities of the case. He concluded that the implications for education are that the educational system should "plan for surprise". Of course, we do not advocate here that educational policy should neglect predictions or projections. We recognize that population projections constitute a necessary tool for educational planners. Also, in an already developed country, where it is possible to project into the future on the bases of reasonably stable parameters in the past, this reliance seems to be justified. In developing countries, manpower projections can be completely erroneous because of a sudden change of the technical and technological parameters of the economic system. While the more qualitative aspects of technological change, such as the shift from textiles to electronics will be felt immediately, changes in the rate of growth of productivity might not be felt for a few years, and then the effects will be noticeable only in unexpected gains or declines in

the unemployment rate and in the growth of national income. The central question for Korea is to what degree will a changing technology and the concomitant changes in the demand-mix alter the profile of the manpower projections. Referring to a second difficulty, Samuel Bowles writes that it is almost impossible to simultaneously identify both the demand and the supply functions for educated labor. He states that ". . . even if labor markets are in equilibrium, the data on labor inputs represent the intersection of a demand and supply schedule; we are unable to distinguish whether the estimated 'requirements' are determined by demand or supply." (Bowles, 1969).

We are of the opinion that the manpower requirements approach, as applied to the Korean educational system and economy, is not adequate. It is feasible to use economic growth forecasts or "targets" to predict the sectoral distribution of output and employment in some future year. It is quite a different task, however, to convert the sectoral distribution of employment to an occupational distribution of the total labor force. And to make long-range forecasts of the distribution of the labor force by level of schooling as computed from the distribution of workers by occupation seems to be an impossible task. This general method of educational planning, that is to use the estimates of required numbers of workers, stratified by educational level, in conjunction with data on existing stocks and expected retirement rates, to generate a plan of necessary enrollment levels in various types of educational institutions has been used frequently in developing and semi-developed countries; however, most planning attempts of this type turn out to be far from satisfactory (Hollister, 1966).

In recent years the burden of financing public education has increasingly been carried by the federal government; thus, Korea's formal education has to a large extent become a publicly controlled service. Planning of education should be increasingly recognized as an integral part of national development planning. Formal education will be more or less effective, depending on whether its share of investment is consistent with its significance in relation to other economic needs. In Korea, the view has been accepted that formal secondary and higher education has multiple functions to perform. One of the main functions being the creation of well-educated people, educated and trained to adapt to a changing economic situation. All types and levels of formal education, especially the secondary level, are thus considered a form of investment in the infra-structure of the Korean society and economy. But education is not a short-term investment. It is an investment with its returns delayed for ten to twenty years, a fact which frequently is over-looked by economists who engage in manpower assessments. After all, it appears to be relatively easy to use an economic plan for the design or lay-out of an educational system. Projected rates of growth and directions of growth can be calculated and long-term manpower assessments will yield endless joy for the manpower planner. Frequently, however, these planners overlook the fact that their projections can, at best, only be approximate. To go one step further: quantitative long-term manpower planning in its present form is obsolete if not dangerous for planning purposes of a developing country.

In view of the present economic situation and on the basis of various short-term manpower forecasts, it can be expected that a quantitative expansion of educational institutions, for the purpose of increasing the number of students beyond the current supply capacity of human resources will generally be restrained in coming years. The techniques of short-term manpower forecasting used in the Ministry of Education and in the Economic Planning Board are reasonably good, and these agencies generally agree that the projected number of graduates from higher educational institutions will exceed the requirements for economic development. It is extremely interesting to note that, based on these quantitative forecasts, both agencies agree that new investment to increase the numbers of students over present levels may be a waste.

III. The Rate of Return to Education In Korea

Cost-and-return analysis in education is not new. What is new to the method is what might be called a systems approach to cost-benefit analysis. This comprehensive view encompasses three functions of cost-return analysis: first, educational expansion must have regard for other social or economic objectives of national development; second, scarce resources must be allocated between different levels and types of the formal educational system; third, a point of major focus, in order to achieve "efficient utilization" of its teaching force, efforts should be made in Korea to change the present labor oriented secondary educational system to a more capital intensive system.

Today, the existing educational plans make little allowance for an accurate regional breakdown of educational cost. But regional costs are extremely important as they can serve as a basis for equalizing educational opportunities in Korea as a whole and for promoting types of education and training which are deficient in individual regions. It is important to remember that the market for skilled and scientific personnel is a national one.

Educational Expenditure as an Investment, an Interim Report of Professor LeRoy J. Peterson on educational financing in Korea, contains a chapter on educational expenditure as an investment. This chapter is sub-divided into parts discussing cost-benefit studies in the United States and cost-benefit studies in Korea. The reader is referred to these sub-chapters as they describe in detail the extensive volume of literature and research on this subject. Regarding the cost-benefit studies in Korea, Professor Peterson refers to three recent studies which have been directed specifically to determine the economic benefit of educationa expenditures in Korea.

Professor Peterson concludes:

> Since the return on the educational investment in Korea is of vital importance, the findings of the (above) studies should be reconciled. The question of the economic return on the educational investment is of sufficient interest in educational finance and for public policy to require specific answers (Peterson, 1969).

A cost-benefit study of particular relevance to Korea because of current emphasis given to vocational-technical education is an examination of private and public costs and utility aspects of

vocational-technical schools in the United States. This study was conducted by Richard H.P. Kraft and investigated social and economic factors in the following areas:

1. the degree to which graduates of selected vocational-technical programs assume occupational earnings levels in business and industry for which the objectives or the programs were designed;
2. the public and private economic costs per student of the programs;
3. the cost-utility model as a conceptual tool for the design and implementation of a planning, programming, budgeting system.

Two aspects of utility were considered: (1) The utility of programs in terms of monetary return on investment to the public or society; and (2) private monetary returns to an individual graduate of the programs.

The final sets of calculations involve the computing of cost-utility ratios between: (1) Private costs and utility; and (2) Public costs and utility (Kraft, 1969).

Findings

Private Rate of Return. The 1969 graduate of selected programs (Electronics Technology) has invested approximately two years of foregone earnings and direct costs totaling $5815. In return he received average earnings of $2312 greater than he would have had he continued as an unskilled manufacturing worker.

These two factors are used in the computation of a cost/utility ratio which yields a figure useful for comparison of the program's relative effectiveness over previous years and relative utility value, limited to the monetary aspects, with other educational programs. This ratio number is also equivalent to the number of years it will take the graduate to receive a return of $5815 or "total return" on his investment. This rate of return assumes that the graduate has no further increases in earnings during the 2.5 year period following his graduation. Since this is a rather weak assumption in that the graduate will more likely receive pay raises during this time, the rate of return is probably conservative.

Public Rate of Return. The return to the public on its investment in vocational-technical education programs was also raised as a question for investigation in this study.

The public (or society) invested $1597 over a period of two years in 1968 graduate's program. For this investment the public received in the form of additional taxes paid by the graduate during this first year of employment $548. The cost-utility ratio indicates a period of less than three years in which the graduate has no increase in earnings during this time period. Again this assumption being unlikely, it would be expected that the graduate will return the investment to the public in an even shorter period of time. The public rate of return of 34.3% is also based on the first year earnings after graduation.

Another important result of the research was the verification of

the theory that cost-benefit procedures allow the forecasting of the costs of new programs over a period of years. Many mistakes have been made in the past because of a failure to take into account the cost, in future years, of programs that are attractive superficially, but that, eventually, prove to be bad educational investments.

Cost-benefit procedures can be valuable in comparing the benefits that may accrue from the more efficient utilization of vocational-technical school facilities by the use of the facilities after hours for adult education or other programs, or through the lengthening of the present school year. In Korea only one cost-benefit study has been directed specifically to determine the economic returns to education. The research was completed in September, 1968 (Kim, Kwang Suk, 1968). Two other projects are still in draft form and will be subject to modification (Chong, Keun Bae, 1969; Moon, Yong Lee, 1969). In their present form they have limitations due mainly to methodological procedures.

IV. Rate-of-Return: A Case Study

An important question entering into the discussion of the rate of return is the purpose for which the cost-benefit calculation is wanted. If one wanted to calculate the private profitablility of investment in educational training then benefits should refer to earnings after tax and cost should refer to private costs only. On the other hand from society's point of view educational benefits refer to income before tax and costs should include all outlays related to

education. Also on the cost side we will have to differentiate between direct costs and indirect costs. While direct costs refer to outlays for schooling pruposes, such as tuition fees paid by individuals, one has to take into account total schooling costs when the social estimation of the rate of return is wanted.

It will be useful to differentiate also between the ex-ante and ex-post application of rate-of-return analysis. In organizational terms this means that cost-benefit comparisons are being undertaken before, and corresponding evaluations after, the implementation of new educational models. Such analysis will indicate whether it would be economically meaningful to substitute capital for labor in the educational transformation process. Given one measurable type of educational output, the calculation of costs and benefits by detailed analysis of educational inputs and of different input combinations can then indicate the most efficient combination.

For this portion of the paper we have relied heavily on the Statistic Year Book of Education, published by the Ministry of Education, the 1967 Report on Wage Survey, published by the Bank of Korea, Seoul, and the 1960 Population and Housing Census of Korea, published by the Economic Planning Board.

It has been acknowledged that people with higher levels of education usually enjoy the benefit of higher life-time earnings. In other words: a college graduate usually earns more than a high school graduate, and the earnings of a high school graduate are higher than

those which a middle school graduate can expect. One limitation of the rate of return approach is the difficulty in estimating to what extent income is due to education alone. After all, frequently the earnings level depends on variables such as parents' education, type of occupation and finally, and quite importantly, the region in which employment is found.

The tendency of educational training to raise the productivity and hence the earning capacity of students is one and only one of the objectives of the educational process. It should not be overlooked that this objective is of declining importance in advanced countries. In Korea, however, the question of raising the productivity is of prime importance. As a matter of fact, in our study we assumed that the difference in earnings between better educated and less educated groups in Korea reflects the difference in their respective productivities.

As earnings of an individual have the tendency to change with his age, years of employment and experience, and unemployment trends, these factors were taken into account.[1]

A comparison of data supplied by the Ministry of Education, the Central Education Research Institute and data found in the 1969 Statistic Yearbook of Education, indicates that there seems to be a general agreement as to what constitutes in-school expenditures. For out-of-school expenditures per student, however, special estimates were

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[1]The author hastens to add that he does not under-estimate the cultural value of education. After all, there are numerous different objectives of education such as cultural benefits, for instance, which usually are excluded from cost-benefit evaluations. The reasons for these restrictions are obvious: it is extremely difficult to measure other benefits than those which are of purely economic nature.

supplied by CERI. It is interesting to note that these estimated ann - out-of-sch l expenditures differ to some extent from those which wer used by Kim Kwang Suk in his 1967 cost-benefit study. Our data indic s that total direct education costs per student, includi g both in-schoc as well as out-of-school expenditures amounted to 14,800 Won[1] for pri y school pupils in 1969. The total direct education cost for middle sch ol students was 30,6000 Won, and for high school students it was 44,100 Won.

Earnings by Level of Education

In order to calculate earnings by levels of education we used the Bank of Korea's 1967 Report on Wage Survey. Data for 1969 was derived by adjustment of the 1967 tables. From discussion with the CERI staf and with economic advisors of the Bank of Korea we gained the impression that Korea's labor market can be classified as competitive in nature. There is a high rate of mobility among middle school and high school graduates who entered the labor market; this is especially true of those who took employment in the following fields:

a. manufacturing
b. mining
c. utilities
d. primary school teaching
e. middle school teaching
f. high school teaching

The qualitative input was highly important for us, as we based our cost-and-return study on the assumption that earnings data from these

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[1]"Won" is the South Korean monetary unit and approximately 310 Won are equivalent to one dollar.

Table 1

Total Education Expenditure per Student 1969
(in Won)

Primary School	14,800
Middle School	30,600
High School	44,100
College and University	146,500

areas reflect average earnings of employees with similar education and attainment in other sectors of the Korean economy.

Table 2 shows the 1969 earnings profile by education and working field. Monthly cash earnings of mining industries workers were multiplied by 114.8, since the Bank of Korea survey indicated that fringe benefits were 14.8 per cent of monthly cash earnings. And annual special earnings for longevity of employment have been derived by applying the average of the annual special earnings to monthly cash earnings.

Finally, the annual gross wages were then used to derive the estimated life time earnings by level of educational attainment and by longevity of employment.

Regarding the earnings profiles, we felt it unnecessary to adjust the earnings data according to the present market conditions. Only if the unemployment would have been high, relative to standards established in previous years, should downward adjustment be made of the earnings differential. The rationale for this is found in the observation that, especially during periods of high unemployment, persons with little education comprise an unusually large proportion of the pool of the unemployed, thus lowering the expected lifetime income of this group.

The Cost of Education

The private cost to an individual (C_i) was determined by

$$C_i = E_i + F + B + S$$

in which E_i represents foregone earnings, F is the fees paid by the student, B is the cost of his educational materials and S is the cost of his miscellaneous supplies.

TABLE 2

Monthly Earnings by Education and Working Field 1969

(Unit: thousand)

	Mining Industries Worker 1/ 5/		Manufacturing Industries Worker 2/ 5/		Electricity Worker 3/ 5/		Primary School Teacher 4/	Middle School Teacher 4/	High School Teacher 4/
Total	16.3	(10.2)	13.0	(8.1)	29.4	(18.4)	20.8	26.5	27.6
Primary (1-6)	13.4	(8.4)	9.1	(5.7)	29.0	(18.1)			
Middle (7-9)	17.1	(10.7)	11.7	(7.3)	27.5	(17.2)			
High (10-12)	20.6	(12.9)	17.3	(10.8)	29.4	(18.4)			
							20.8 6/		
College & Univ. (13-)	34.6	(21.6)	30.4	(19.0)	31.4	(19.6)		26.5 7/	27.6 7/

* Included are Regular and Extra earning (Not in teachers' earnings)

1/ The Bank of Korea, Report on Wage Survey 1967, BOK. p. 65.

2/ " " p. 93.

3/ " " p. 246.

4/ M.O.E. FY 1970 Revenue and Expenditure Budget by Specific items, M.O.E. pp. 1080-1084.

5/ ( ) Multiplied by 160, because of every year 30% wage increased 1968 and 1969 based on 1967.

6/ The majority of primary school teachers graduate from junior teachers colleges.

7/ Middle school teachers and high school teachers graduate from universities and colleges.

An estimate of the earnings a student foregoes while enrolled in various programs is based upon:

1) Mean hourly earnings of skilled labor in general manufacturing for the areas served by the schools for 1967 and 1969;
2) Extrapolating percentage of increase in earnings for the five years prior to the Bank of Korea's 1967 Report of Wage Survey; and
3) Computing the total foregone earnings for the mean time period, that is, the total number of school terms a graduate would be enrolled. The cost of books and miscellaneous supplies was determined from records kept by CERI. It is assumed that the cost of traveling to and from school is equal to the cost of traveling to and from place of employment.

Public Costs

To derive the annual educational expenditures per student, by different levels of school, costs of schooling were broken down into in-school expenditures and out-of-school expenditures. The in-school expenditures are comprised of national education expenditures, the expenditures of local governments for their public schools, expenditures for private schools, PTA allowances and expenditures for experimentation and R & D. The out-of-school expenditures, which totaled almost one billion Won in 1969, are the type of educational expenses that students have to bear. These include expenditures for textbooks, learning materials, stationary, special activities in schools, various tests to be taken, school health, transportation, uniforms and the costs of tutoring or outside studies.

The next step in our survey consisted of combining this data to derive the cost and earnings differentials, by levels of education, as shown in Table 3. It is assumed that graduates of primary schools have earnings during their 14th year of age. For middle school graduates, high school graduates and graduates of colleges and universities, we assumed that the stream of future earnings starts during the first year after graduation. The staff of CERI agree that the age of 65 can be considered the "normal" retirement age for Korean males. For a detailed explanation of Table 3 the reader is referred to the footnotes which explain the profile and contents.

We now have enough information to calculate the first rate-of-return estimates. The information needed is contained in columns 1, 2, and 3 in Table 3. Column 1, for instance, shows the calculated net earnings due to middle school education, that is, the difference in expected earnings between graduates of primary school and those of middle school. Likewise, column 2 shows the net education cost (or net excess of income) of a high school graduate as compared to a middle school graduate, and in column 3 the education costs and the stream of net earnings of college and university graduates were compared with those of high school graduates. No foregone earnings were assumed for males 13 years old or less.

The following formula was used to calculate the difference in expected life time earnings between graduates of middle schools, high schools, and colleges and universities.

$$(1) \quad \sum_{i=1}^{n} \frac{B_i}{(1+r)^i} = \sum_{j=1}^{m} C_j (1+r)^j$$

Table 3

Cost and Earnings Differentials by Level of Education
(in thousand Won per annum)

(A) age	(1) NEm(NCm)	(2) NEh(NCh)	(3) NEc(NCc)
12	(-30.6)		(-30.6)
13	(-30.6)		(-30.6)
14	(-129.0)		(-129.0)
15	0	(-167.4)	(-167.4)
16	23.9	(-191.3)	(-167.3)
17	-27.2	(-191.3)	(-218.5)
18	40.8	-35.1	(-320.9)
19	40.8	2.0	(-320.9)
20	40.8	2.0	(-320.9)
21	40.8	74.8	(-320.9)
22	40.8	74.8	153.1
23	40.8	74.8	219.9
24	40.8	74.8	219.9
25	103.1	-54.8	263.9
26	103.1	-54.8	263.9
27	103.1	-54.8	263.9
28	103.1	148.3	263.9
29	103.1	148.3	263.9
30	103.1	148.3	263.9
31	103.1	148.3	263.9
32	103.1	148.3	495.7
33	103.1	148.3	495.7
34	106.9	148.3	499.5
35	187.7	67.5	499.5
36	187.7	67.5	499.5
37	187.7	67.5	499.5
38	187.7	130.1	499.5
39	187.7	130.1	499.5
40	187.7	130.1	499.5
41	187.7	130.1	499.5
42-65	187.7	130.1	300.5

(1) HEm(NCm) = Net excess of income or net education cost (in parenthesis) of a middle school graduate as compared to a primary school graduate.

(2) NEh(NCh) = Net excess of income or net education cost (in parenthesis) of high school graduate as compared to middle school graduate.

(3) NEc(NCc) = Net excess of income or net education cost (in parenthesis) of college graduate as compared to high school graduates.

Where B_i = i^{th} year difference in expected lifetime earnings between higher educated and less educated persons;

C_j = j^{th} year costs (total cost) of education including foregone earnings and experience;

$i = 1, 2, 3, 4, 5, \ldots . n$, number of working years

$j = 1, 2, 3, \ldots m$, number of years of school attendance

r = discount rate

The objective of this calculation is to equate both sides of the equation. Thus, by iteration we will find the internal rate of return (r), or discount rate, which equates the present value of extra lifetime earnings attributable to extra amounts of education with the present value of the costs of the additional education. In solving (1) given the values of B_i and C_j, the values of r that will equate the left hand side of (1) to the right hand side, have been searched out in steps of 0.0001 and r = 0.2000.

It was assumed that the internal rate of return will not be larger than 25 per cent. The computations were performed at Korean Institute of Science and Technology, Seoul, on a CDC 3300 Computer.

The following table presents the result of our rate of return calculation. The findings indicate that at the high school level the rate of return (11.2%) is almost of the same magnitude as the one for college and university graduates (9.5%). The rate on middle school education, however, is noticeably higher (20.0%) and exceeds the other rate of returns by almost 100%.

Table 4

Rates of Return on Education in Korea

	Rate of Return
Middle School Education	20.0%
High School Education	11.2%
College and University Education	9.5%

V. Summary

The cost-benefit analysis which we have been carrying out indicates that the social and private rate of return of middle school education is high in comparison with other investments. Education has, however, other objectives besides being an economic investment in human capital. And certain extrinsic goals, such as social, cultural and political goals, should be considered in future rate of return studies. Technically these goals could be quantified and the numerical indicators could become the required weights which one would apply to the educational output.

Concerning the interpretation of the rate of return profiles which have been constructed, it can be said that they have noteworthy implications for the Korean government and top level decision makers in the education field.

a) The rate of return of educational investment at middle school level is astonishingly high.

b) If monetary indices are accepted as a measure of effectiveness and productivity, then, in view of the excellent performance of graduates of middle schools in the labor market, extra public funds should be allocated for this level in order to maximize private and public benefits.

In other words, if Korean educational decision makers are really concerned with earnings, employment and maximizing economic benefits, then the expansion of middle schools should be given high priority.

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